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⑰ **Dry-shaving apparatus.**

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Description

The invention relates to a dry-shaving apparatus comprising a housing which comprises a holder for at least one cutting unit, which cutting unit comprises an external cutting member which is formed with hair-entry apertures and is movable relative to the holder, an internal cutting member which is drivable relative to the external cutting member, the external cutting member being detachably secured to a retaining plate situated inside the holder and the internal cutting member being retained between the external cutting member and the retaining plate.

Such a dry shaving apparatus is known, for example, from NL-A 7 607 258. In this known construction however the external cutting members are not movable relative to the holder so that no adjustment of the cutting units in response to the shaving pressure on the skin is possible.

It is the object of the invention to solve this problem and to this end the invention is characterized in that the retaining plate is mounted in the holder against at least one resilient element so as to be movable relative to the holder in a direction which is substantially perpendicular to the plane of the retaining plate.

Special embodiments are defined in the appended subsidiary Claims.

An embodiment of the invention will now be described in more detail, by way of example, with reference to the accompanying drawings. In the drawings:

Figure 1 is a front view of a dry-shaving apparatus in accordance with the invention.

Figure 2 is a side view of the dry-shaving apparatus shown in Figure 1.

Figure 3 is a sectional view taken on the line III-III in Figure 1.

Figure 4 is a plan view showing a part of the retaining plate used in the embodiment shown in Figure 3.

Figure 5 is a side view in accordance with the arrow P in Figure 4.

Figure 6 is a plan view of the elastic band of the dry-shaving apparatus shown in the preceding Figures.

The dry-shaving apparatus shown in the Figures comprises a housing 1 having a holder 2 for three cutting units 3. A cutting unit 3 comprises an external cutting member 4 formed with hair-entry apertures 5 and an internal cutting member 6 which is rotatable relative to the external cutting member. The internal cutting members can be driven by means of an electric motor which is accommodated in the housing and which is coupled to the internal cutting members in known manner. For the sake of simplicity this drive is not shown in the Figures.

The external cutting members 4 are detachably secured to a retaining plate 7 arranged inside the holder 2. For this purpose the retaining plate 7 is provided with a separate common fixing element 8 which is made of metal sheet and which is secured to a plastics carrier 9. For each external

cutting member 4 the fixing element comprises two resilient arms 10 with projections 11 on their ends. These projections 11 engage tightly around the annular flange portion 12 of a cutting member 4, so that this cutting member 4 is clamped onto the carrier 9 of the retaining plate 7. As a result of this, separate means for locking the external cutting member 4 against rotation with the internal cutting member 6 may be dispensed with. The internal cutting members 6 are retained between the external cutting members 4 and the carrier 9. The cutting members can be mounted on or removed from the retaining plate 7 in a simple manner by moving the external cutting members 4 in a direction parallel to the plane of the retaining plate.

The holder 2 is provided with a central pin 13 which projects through a central aperture 14 in the retaining plate 7. A fixing knob 15 is screwed onto the end portion of the central pin 13, a resilient element in the form of a helical spring 16 being compressed between the retaining plate 7 and the fixing knob 15. This enables the retaining plate 7 to be moved to a limited extent relative to the holder 2 in the axial direction of the central pin 13. As a result of this, the external cutting members secured to the retaining plate 7 are also movable relative to the holder 2 in directions substantially corresponding to the axial direction of the central pin 13. In general, the position of the retaining plate 7 in the holder 2 will be such that a part of each external cutting member 4 projects from the holder.

As a result of the combination of steps described above, the cutting unit together with the retaining plate is movable relative to the holder in a direction substantially perpendicular to the plane of the retaining plate. Thus, an excessive contact pressure between the cutting unit and the skin to be shaved can be avoided and if the shaving apparatus comprises a plurality of cutting units these units adapt themselves better to the curvature of the skin. When the retaining plate is removed the cutting units remain attached to the retaining plate, so that there are no loose parts which can fall out of the apparatus. The cutting units can be removed separately from the retaining plate in a simple manner, for example for the purpose of cleaning, without the risk of parts thereof being interchanged with those of another cutting unit.

The forces exerted on the cutting units by the skin during shaving are partly transmitted to the apparatus via the retaining plate 7 and the resilient element 16. As a result of this, the forces acting between an internal cutting member and an external cutting member in the embodiment described above are smaller than in the case of a construction where the external cutting member is supported only by the internal cutting member. This reduces frictional losses, so that a lower motor power may be used. Moreover, the rate of wear of the cutting members is reduced.

In the special embodiment shown in Figures the extent to which the external cutting members

project from the holder can be varied by means of an adjusting element which enables the position of the retaining plate 7 in the holder 2 to be varied. This adjusting element comprises an elastic annular band 17 situated in a groove 18 in the outside of the holder 2. The elastic band 17 comprises three inward projections 19 which extend through apertures 20 in the holder 2 and engage with the carrier 9 of the retaining plate 7. At corresponding locations the carrier 9 comprises three stepped portions 21 with steps 21', 21'' and 21''', the stepped portions 21 being urged against the projections 19 under the influence of the compression spring 16. If the projections 19 lie against the steps 21' the retaining plate 7 occupies a position in which the external cutting members 4 project from the holder 2 to a maximum extent. By shifting the elastic band 17 in the groove 18 the projections 19 can be made to engage with the steps 21'' or 21''', in which case the external cutting members 4 project less far from the holder 2. The band 17 is marked with a pointer 22 which in each of the three relevant positions of the elastic band 17 faces a mark on the housing 1. In this way the shaving properties of the apparatus can be modified and adapted simply to personal needs.

The elastic band 17 can be mounted simply onto the apparatus and provides a large gripping area for moving the band. The band also provides a satisfactory grip if the entire holder is to be removed, in particular if the band is longitudinally corrugated as shown in Figure 6.

Instead of a stepped wall portion the retaining plate can be provided with a wall portion having an inclined contact surface for the projections 19, enabling the position of the retaining plate relative to the holder to be varied continuously within certain limits.

Claims

1. A dry-shaving apparatus comprising a housing (1) which comprises a holder (2) for at least one cutting unit (3), which cutting unit comprises an external cutting member (4) which is formed with hair-entry apertures (5) and is movable relative to the holder (2), an internal cutting member (6) which is drivable relative to the external cutting member (4), the external cutting member (4) being detachably secured to a retaining plate (7) situated inside the holder (2), and the internal cutting member (6) being retained between the external cutting member (4) and the retaining plate (7), characterized in that the retaining plate (7) is mounted in the holder (2) against at least one resilient element (16) so as to be movable relative to the holder (2) in a direction which is substantially perpendicular to the plane of the retaining plate (7).

2. A dry-shaving apparatus as claimed in Claim 1, having a rotatable internal cutting member (6) and a corresponding external cutting member (4) with an annular flange portion (12), characterized in that the retaining plate (7) carries two resilient

arms (10), which arms engage around the flange portion (12).

3. A dry-shaving apparatus as claimed in Claim 2, characterized in that the apparatus comprises at least two cutting units (3), the external cutting members (4) being secured to a common retaining plate (7).

4. A dry-shaving apparatus as claimed in Claim 3, characterized in that two resilient arms (10) engage around the flange portion (12) of each external cutting member (4) and form part of a separate common fixing element (8) which is made of metal sheet and is secured to the retaining plate (7).

5. A dry-shaving apparatus as claimed in any one of the preceding Claims, characterized in that the holder (2) comprises an adjusting element (17, 19) by means of which the position of the retaining plate (7) relative to the holder (2) can be varied.

6. A dry-shaving apparatus as claimed in Claim 5, characterized in that the adjusting element comprises an elastic annular band (17) which is movably arranged around the outside of the holder (2) and comprises a projection (19) which extends through an aperture (20) in the holder (2) and engages with the retaining plate (7).

7. A dry-shaving apparatus as claimed in Claim 6, characterized in that the projection (19) engages with a stepped wall portion (21) of the retaining plate (7), the position of the retaining plate (7) relative to the holder (2) and hence the extent to which the external cutting member (4) projects from the holder (2) being variable by moving the projection (19) over the stepped wall portion (21).

8. A dry-shaving apparatus as claimed in Claim 6, characterized in that the elastic band (17) is longitudinally corrugated.

Patentansprüche

1. Trockenrasierapparat mit einem Gehäuse (1), das eine Halterung (2) für wenigstens eine Schneideinheit (3) aufweist, wobei diese Schneideinheit ein äußeres Schneidelement (4) aufweist, das mit Haareintrittsöffnungen (5) ausgebildet und gegenüber der Halterung (2) beweglich ist, sowie ein gegenüber dem äußeren Schneidelement (4) antreibbares inneres Schneidelement (6), wobei das äußere Schneidelement (4) entfernbar an einer Schließplatte (7) innerhalb der Halterung (2) befestigt ist und wobei das innere Schneidelement (6) zwischen dem äußeren Schneidelement (4) und der Schließplatte (7) eingeschlossen ist, dadurch gekennzeichnet, daß die Schließplatte (7) in der Halterung (2) gegen wenigstens einem Federelement (16) angeordnet ist, wodurch sie gegenüber der Halterung (2) in einer Richtung beweglich ist, die sich im wesentlichen senkrecht zu der Ebene der Schließplatte (7) erstreckt.

2. Trockenrasierapparat nach Anspruch 1 mit einem drehbaren inneren Schneidelement (6) und einem entsprechenden äußeren Schneidelement

(4) mit einem ringförmigen Flanschteil (12), dadurch gekennzeichnet, daß die Schließplatte (7) zwei Federarme (10) aufweist, die den Flanschteil (12) umgreifen.

3. Trockenrasierapparat nach Anspruch 2, dadurch gekennzeichnet, daß der Apparat wenigstens zwei Schneideinheiten (3) aufweist, wobei die äußeren Schneidelemente (4) auf einer gemeinsamen Schließplatte (7) angeordnet sind.

4. Trockenrasierapparat nach Anspruch 3, dadurch gekennzeichnet, daß zwei Federarme (10) den Flanschteil (12) jedes der äußeren Schneidelemente (4) umgreifen und einen Teil eines einzelnen gemeinsamen Befestigungselementes (8) bilden, das aus Metallblech hergestellt und auf der Schließplatte (7) befestigt ist.

5. Trockenrasierapparat nach einem der vorstehenden Ansprüche, dadurch gekennzeichnet, daß die Halterung (2) ein Einstellelement (17, 19) aufweist, durch das die Lage der Schließplatte (7) gegenüber der Halterung (2) geändert werden kann.

6. Trockenrasierapparat nach Anspruch 5, dadurch gekennzeichnet, daß das Einstellelement ein elastisches, ringförmiges Band (17) aufweist, das um die Außenseite der Halterung (2) beweglich angeordnet ist und einen Vorsprung (19) aufweist, der sich durch eine Öffnung (20) in der Halterung (2) erstreckt und mit der Schließplatte (7) zusammenarbeitet.

7. Trockenrasierapparat nach Anspruch 6, dadurch gekennzeichnet, daß der Vorsprung (19) mit einem gestuften Wandteil (21) der Schließplatte (7) zusammenarbeitet, wobei die Lage der Schließplatte (7) gegenüber der Halterung (2) und folglich das Ausmaß, in dem das äußere Schneidelement (4) von der Halterung (2) hervorspringt, dadurch veränderlich ist, daß der Vorsprung (19) über den gestuften Wandteil (21) bewegt wird.

8. Trockenrasierapparat nach Anspruch 6, dadurch gekennzeichnet, daß das elastische Band (17) in der Längsrichtung gewellt ist.

Revendications

1. Rasoir à sec comportant un boîtier (1) pourvu d'un support (2) pour au moins une unité de coupe (3), unité de coupe comportant un élément de coupe extérieur (4) présentant des ouvertures d'entrée de poil (5) et pouvant se déplacer par rapport au support (2), un élément de coupe intérieur (6) pouvant être entraîné par rapport à l'élément de coupe extérieur (4), l'élément de

coupe extérieur (4) étant fixé de façon détachable à une plaque de retenue (7) située dans le support (2), et l'élément de coupe intérieur (6) étant maintenu entre l'élément de coupe extérieur (4) et la plaque de retenue (7), caractérisé en ce que, dans le support (2), la plaque de retenue est montée contre au moins un élément élastique (16) de façon à pouvoir être déplacé par rapport au support (2) dans une direction sensiblement perpendiculaire au plan de la plaque de retenue (7).

2. Rasoir à sec selon la revendication 1, muni d'un élément de coupe intérieur rotatif (6) et d'un élément de coupe extérieur correspondant (4) présentant une collerette annulaire (12), caractérisé en ce que la plaque de retenue (7) porte deux bras élastiques (12) qui prennent autour de la collerette (12).

3. Rasoir à sec selon la revendication 2, caractérisé en ce qu'il comporte au moins deux unités de coupe (3), les éléments de coupe extérieurs (4) étant fixés à une plaque de retenue commune (7).

4. Rasoir à sec selon la revendication 3, caractérisé en ce que les deux bras élastiques (10) prennent autour de la collerette (12) de chaque élément de coupe extérieur (4) et font partie d'un élément de fixation commun séparé (8) en tôle métallique fixé à la plaque de retenue (7).

5. Rasoir à sec selon l'une quelconque des revendications précédentes, caractérisé en ce que le support (2) comporte un élément d'ajustement (17, 19) permettant de faire varier la position de la plaque de retenue (7) par rapport au support (2).

6. Rasoir à sec selon la revendication 5, caractérisé en ce que l'élément d'ajustement comporte une bande annulaire élastique (17) disposée de façon mobile autour de la face extérieure du support (2) et comportant une saillie (19) s'étendant à travers une ouverture (20) dans le support (2) et qui est accouplée à la plaque de retenue (7).

7. Rasoir à sec selon la revendication 6, caractérisé en ce que la saillie (19) est accouplée à une partie de paroi à gradin (21) de la plaque de retenue (7), la position de la plaque de retenue (7) par rapport au support (2) et, par conséquent, la mesure dans laquelle l'élément de coupe extérieur (4) dépasse du support (2) étant variables par déplacement de la saillie (19) sur la partie de paroi à gradin (21).

8. Rasoir à sec selon la revendication 6, caractérisé en ce que la bande élastique (17) est ondulée dans le sens longitudinal.

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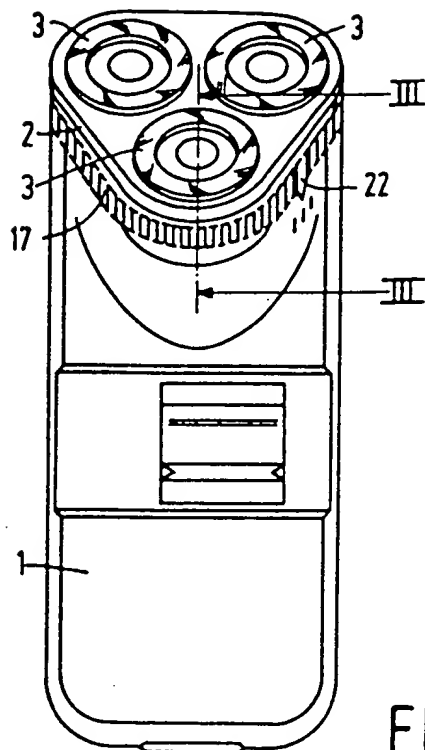


FIG.1

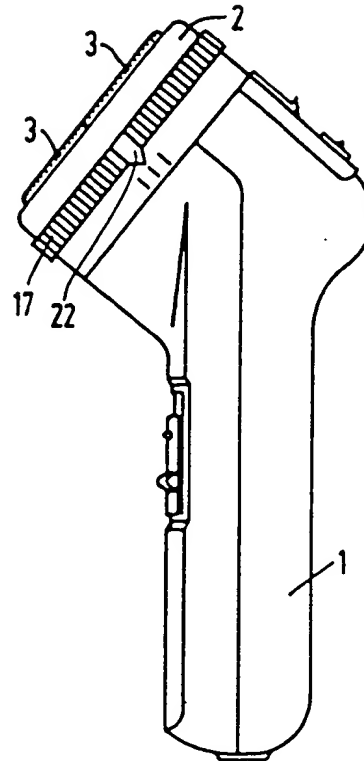


FIG.2

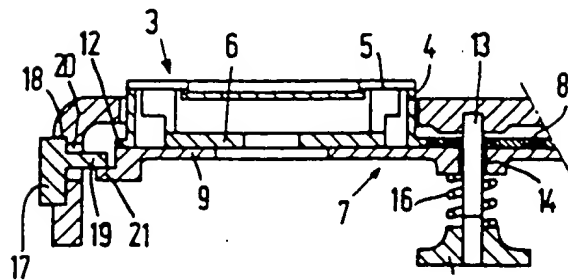


FIG.3

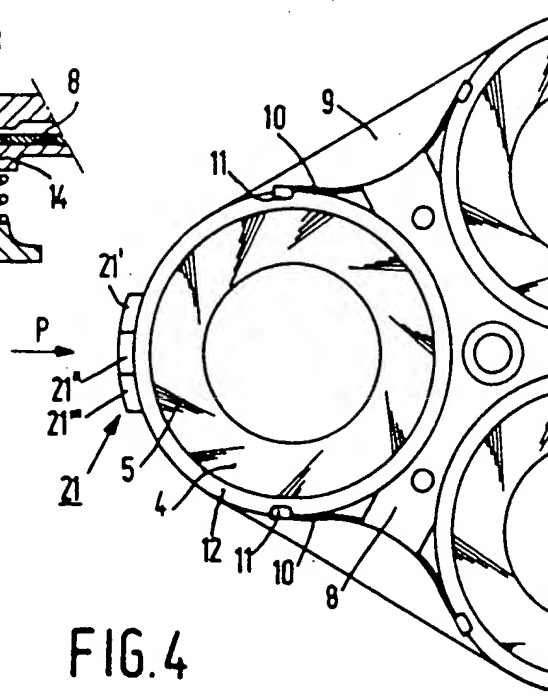


FIG.4

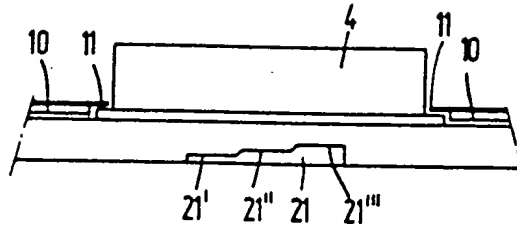


FIG.5

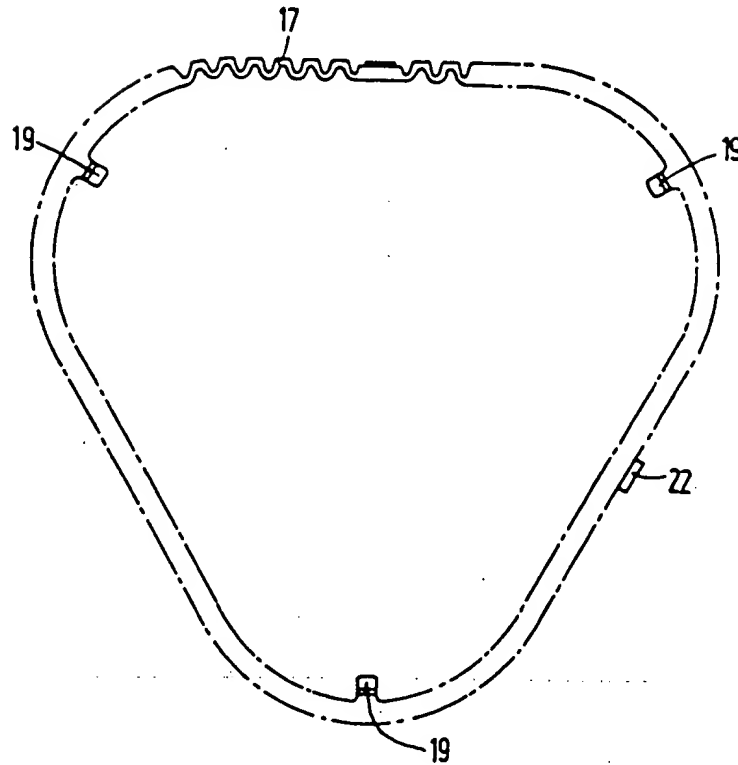


FIG.6

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